

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 5

G&H INDUSTRIAL LANDFILL SITE
Macomb County, Michigan

FIVE-YEAR REVIEW (Type I)

I. Introduction

Purpose

The United States Environmental Protection Agency ("U.S. EPA"), in consultation with the Michigan Department of Environmental Quality ("MDEQ"), has conducted the first five-year review for the G&H Industrial Landfill Superfund site ("G&H site" or "the site") pursuant to CERCLA section 121(c), NCP section 300.400(f)(4)(ii), and OSWER Directives 9355.7-02 (May 23, 1991), 9355.7-02A (July 26, 1994), and 9355.7-03A (December 21, 1995). The purpose of a five-year review is to ensure that a site remedy remains protective of human health and the environment and that the remedy is functioning as designed. U.S. EPA conducted a Type I five-year review for the G&H site since remedy construction is now complete (and certain response actions (i.e. operation and maintenance) are ongoing), but contaminants remain at the site above levels that would allow unrestricted use of the property. This document will become part of the G&H site file and it will be placed into the site information repository located at the Shelby Township Library, Utica, Michigan.

Site Characteristics

The G&H site is located in Shelby Township, Macomb County, Michigan, approximately 20 miles north of Detroit. The site is comprised of approximately 60 acres of landfilled property plus up to 30 acres of mitigated and replacement wetlands and other impacted areas including a former junkyard (see Figure 1).

From 1955 until 1973, G&H Industrial Landfill, Inc. accepted waste oil and solvents and municipal waste for disposal. By the mid-1960's State authorities had noted that groundwater contamination was occurring in areas south of the site and prohibited the further disposal of industrial solvents in the landfill. Later, the State discovered oil that was contaminated with polychlorinated biphenyls ("PCBs") seeping out of the landfill. Following this discovery, the State of Michigan referred the site to U.S. EPA in 1982. U.S. EPA performed a site inspection in 1982 and, under its CERCLA authority, subsequently proposed the site for listing on the National Priorities List ("NPL") in July 1982. Pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, U.S. EPA placed the G&H site on the NPL by publication in the Federal Register on September 8, 1983 (48 Fed. Reg. 40658).

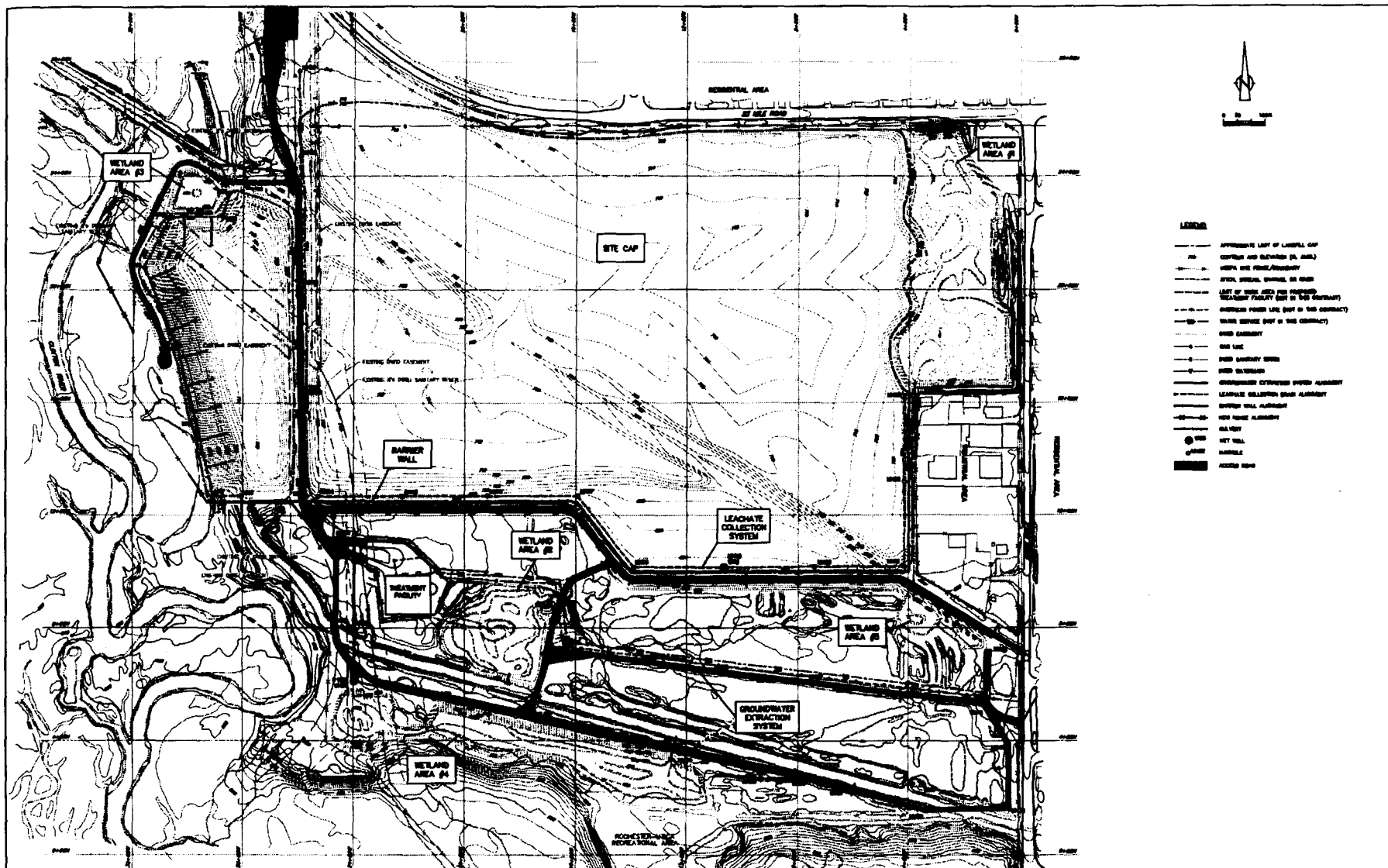


Figure 1: G&H Industrial Landfill, Macomb County, Michigan

Remedial Investigation

U.S. EPA, in consultation with the Michigan Department of Natural Resources, now the MDEQ, began a Remedial Investigation and Feasibility Study ("RI/FS") at the G&H site in 1984. U.S. EPA performed the RI in three separate phases over a five-year period due to the size and complexity of the site. MDEQ also initiated a Supplemental Investigation ("SI") at the site in 1988-89 and later provided the SI information to U.S. EPA to augment the final RI report. U.S. EPA released the final RI report in August 1990. The major findings included:

- Three phases of landfill operations are present; the largest, Phase I, is where much of the waste oils and solvents were disposed of (see Figure 1).
- The landfilled materials were placed over a 0 to 30-foot thick local water table aquifer consisting primarily of sand with some small gravel seams. Several local residences on the eastern boundary of the site used this aquifer as a primary source of drinking water, although their wells were not impacted by the landfill.
- The water table aquifer overlies a thick glacial till layer that serves as an aquitard. The till layer overlies a regional aquifer that does not contain water suitable for use as drinking water.
- The property has been, and continues to be, a source of groundwater contamination in the upper aquifer. A groundwater contaminant plume consisting of volatile organic compounds ("VOCs") has migrated south at least 500 feet from the southern edge of the landfilled areas.
- The predominant organic compounds of concern in groundwater include benzene, vinyl chloride, toluene, xylene, and trichloroethene, based upon concentrations and potential impacts to human health and the environment.
- Surface soils located in the former junkyard area adjacent to the northeastern edge of the site were contaminated with PCBs, lead, and VOCs derived from solvent dumping activities. Sampling indicated that PCB-contaminant levels exceeded a 1 part per million ("ppm") cleanup level.
- Potential long-term exposure to high levels of VOCs through the use of private wells in contaminated groundwater on-site and plausible long-term exposure to low levels of VOCs in the aquifer downgradient of the site (if left unabated) were identified as principal threats to human health and the environment. Exposure to high levels of PCBs in the oil seep and to lead in surface soils was also identified as a principal threat.

Record of Decision

Based on the findings of the RI, U.S. EPA completed an FS that evaluated remedial alternatives, including a "No Action" remedy and a treatment remedy (incineration of the landfill contents), to address the principal threats at the site. U.S. EPA released the FS and issued a Proposed Plan for Remedial Action ("RA") in August 1990 for public comment. Following a 30-day public comment period on the Proposed Plan, U.S. EPA issued a Record of Decision ("ROD") on December 21, 1990, that called for a containment remedy consisting of the following:

- The installation of a modified RCRA Subtitle C landfill cover ("cap") to prevent direct contact with contaminants in the landfill and to reduce the rate of precipitation infiltration through the landfilled waste into the water table aquifer;
- Excavation of PCB-impacted soils from areas outside of the landfill proper with consolidation of the impacted soils beneath the landfill cap;
- The installation of a slurry wall around the landfill areas, except for the west side where a slurry wall was not practicable, to physically contain the landfill contents. A toe drain would be installed on the west side of the landfill to capture leachate for treatment;
- Installation of a groundwater extraction and treatment system to capture and draw back the groundwater contaminant plume and to also hydraulically contain the landfill contaminants by creating a 2-foot inward groundwater gradient along the slurry wall alignment;
- Implementation of a groundwater monitoring program to ensure the adequacy of the groundwater contaminant plume cleanup; and,
- The mitigation of impacted wetlands and the creation of new wetlands (in the former junkyard area (see Figure 1)) to replace those wetland values lost due to contamination or to the impending cleanup action at the site.

The selected remedy established cleanup standards for groundwater outside of the landfilled areas based on Safe Drinking Water Act Maximum Contaminant Levels ("MCLs"), risk-based levels, and existing State of Michigan criteria for protection of groundwater quality.

Shortly after issuing the ROD, U.S. EPA conducted cleanup discussions with the G&H Potentially Responsible Party Group ("Group"). As U.S. EPA was reaching a cleanup agreement with the Group, the Agency issued an Explanation of Significant Differences ("ESD") document in March 1992. In the ESD the Agency determined that the slurry

wall did not need to completely encircle the landfill, as placing a slurry wall along the upgradient edge of the landfill may cause groundwater to back up behind the slurry wall and perhaps rise up into the basements in the homes north of the landfill.

U.S. EPA reached a cleanup agreement with the Group in July 1993. The agreement is embodied in a Consent Decree ("CD") and sets forth the methods that the Group must follow to implement the remedial action in the ROD as modified in the ESD.

II. Discussion of Remedial Objectives

Remedial Design

The remedial design ("RD") phase began upon entry of the CD in July 1993 and it was completed in December 1995. The Group broke up the design into two parts, one of which was the groundwater and leachate treatment system and the other consisted of the remaining work (landfill cap, slurry wall, etc.). During the RD phase, U.S. EPA, in consultation with MDEQ, reviewed, commented on, and approved the two portions of the design package.

Several design changes were proposed by the Group for U.S. EPA, in consultation with MDEQ, review and approval. The major design change involved the use of a combination of 1 foot of clay and a bentonite-containing geotextile liner in place of the required 3 feet of clay in a Subtitle C landfill cap. The Group was able to demonstrate equivalent performance of the clay/geotextile liner versus the thicker clay layer to support the design change.

Remedial Action

The Group, under U.S. EPA oversight, began construction of the remedial action ("RA") components in August 1996. Generally, the cleanup action was performed as designed except for modifications made due to unexpected field conditions encountered as construction work progressed. One major modification consisted of the deletion of a small portion of the slurry wall alignment on the extreme southwest side of the site due to the presence of an unexpected concrete support structure discovered next to the 8-foot diameter water main owned by the city of Detroit (see Figure 1). The city requested that the slurry wall not be constructed on the west side of the water main so as to not disturb the pipeline or its support structure. This required the Group to modify the groundwater extraction system so that it could pump more water from the aquifer in that area to create hydraulic containment conditions in lieu of physical containment of the landfill.

Later, the Group proposed that it be permitted to delete a portion of the groundwater extraction system designed for the aquifer south of the landfill to test a 'modified natural

attenuation' approach to aquifer cleanup. The Group produced a contingency plan to deal with adverse situations, should any occur, related to this design change. Additional groundwater monitoring or the installation of the deleted portion of the system are two of the contingencies that could be implemented should conditions warrant. U.S. EPA accepted the proposal, in consultation with MDEQ, although MDEQ did not recommend that the proposal be accepted. U.S. EPA accepted the proposal since the Group installed and would operate a portion of the downgradient pumping system, it developed a contingency plan for the action, and because there is no one using the aquifer as a source of drinking water at this time. This affords the Agency some time to study the modified natural attenuation approach to aquifer cleanup in the downgradient plume area.

The Group notified U.S. EPA that it was nearing construction completion in May 1999. Following a "pre-pre-final" inspection by U.S. EPA's oversight contractor on May 25, 1999, the U.S. EPA remedial project manager ("RPM"), in consultation with MDEQ, conducted a pre-final inspection at the site on June 8, 1999. A punch list of 50 items was compiled and was later provided to the Group to complete.

The RPM held a final inspection of the remedial action, including the groundwater extraction and treatment system, on August 24, 1999. At that time, the RPM determined that the remedial action, including the groundwater extraction and treatment system, was fully constructed and was operating as designed. U.S. EPA signed a Preliminary Closeout Report ("PCOR") on August 26, 1999. The Group began the interim Operation and Maintenance ("O&M") phase of the remedy immediately following construction completion and later submitted a draft RA Report to U.S. EPA for review and approval. U.S. EPA, in consultation with MDEQ, accepted the final RA Report on June 21, 2000, beginning the O&M phase of the cleanup action.

Quality Assurance/Quality Control

U.S. EPA conducted oversight of the Group's remedial design and remedial action construction management activities at the site through the ARCS and RAC contracting programs. All design plans and field activities were reviewed and approved by U.S. EPA, in consultation with MDEQ, to ensure consistency with the ROD, the RD and RA work plans, and federal and State requirements.

The design and construction QA/QC program utilized throughout the RD/RA by the Group was in accordance with U.S. EPA protocols. Details of the analytical procedures used to ensure the quality of the work are contained in the approved Quality Assurance Project Plan for the pre-design studies and for construction of the remedial components (Construction Quality Assurance Plan). The construction QA/QC program utilized has been sufficient to allow U.S. EPA to make the determination that all reported materials specifications are adequate and construction methods used allowed remedy

construction to be satisfactorily performed in accordance with the ROD and the ESD.

Monitoring Program

A site-wide monitoring program has been established for the O&M phase of the cleanup. The Group will conduct quarterly groundwater monitoring (water level measurements and chemical sampling) events to ensure that hydraulic containment of the landfill contents is occurring and that chemical levels in the groundwater contaminant plume outside the slurry wall are decreasing. Analyses to be performed will include the chemicals of concern listed in the ROD and CD and those parameters required under the discharge permit equivalent (Substantive Requirements Document ("SRD")) issued by MDEQ which requires that the Group meet the substantive requirements of the National Pollutant Discharge Elimination System ("NPDES") program. At a later date groundwater monitoring will be performed semi-annually and then annually as necessary. U.S. EPA, in consultation with MDEQ, will certify completion of groundwater remediation activities once it has been determined that clean-up levels have been attained and maintained for all chemicals of concern listed in the ROD, ESD, and CD.

Potentially impacted surface soils in areas not capped have been sampled by the Group to verify that they have met the soil cleanup levels for PCBs. Thus, soil sampling will not occur as groundwater treatment progresses. However, the Group will monitor the landfill cap and landfill gas levels to ensure that the cap remains intact and that landfill gas does not present an explosive threat to nearby homes and businesses. Lastly, the Group will periodically inspect and repair as necessary the mitigated wetlands areas to ensure that they continue to thrive.

III. ARARs Review

The applicable or relevant and appropriate requirements ("ARARs") associated with the cleanup action at the site are listed in the ROD and the ESD. Site ARARs include those that cover groundwater contamination, PCBs, and the closure of the landfill. A review of the major ARARs is presented below:

Groundwater

Groundwater ARARs include the requirements of the Federal Safe Drinking Water Act ("SDWA") (MCLs as cleanup standards) and Clean Water Act and the State Safe Drinking Water (Michigan Act 399) and Environmental Response Acts (Michigan Act 307 of 1982, as amended). Since MCLs were not protective (i.e. the estimated risk of using the groundwater as drinking water fell outside of U.S. EPA's target risk range of 1×10^{-4} to 1×10^{-6} excess cancer risk for carcinogens or a Hazard Index ("HI") of 1 for non-carcinogens) and the existing state requirements were more stringent, U.S. EPA

determined that the following chemical-specific cleanup levels would apply. These values were either risk-based values or regulatory values (or both):

Compound	Cleanup Standard	Source
Benzene	1 ppb	ROD; Act 307
Xylene	20 ppb	ROD; Act 307
Ethylbenzene	30 ppb	ROD; Act 307
Vinyl chloride	1 ppb	ESD; Act 307
Lead	5 ppb	ROD; Act 307
Trichloroethene	3 ppb	ROD; Act 307
Tetrachloroethene	1 ppb	ESD; Act 307
cis-1,2-Dichloroethene	1 ppb	ROD; Act 307
trans-1,2-Dichloroethene	100 ppb	ROD; Act 307
1,1-Dichloroethane	1 ppb	ESD; Act 307
Arsenic	0.02 ppb*	ROD; Act 307

*Note: The value for arsenic would be set at its background level since arsenic is naturally occurring in groundwater in Michigan at levels above the cleanup standard.

Upon review of current SDWA MCLs, all groundwater cleanup standards remain below the corresponding MCLs. The state has promulgated the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, in place of Act 307 values (Part 201 groundwater cleanup standards would apply). The Part 201 cleanup standards are generic and are set at a risk-based level of 1×10^{-5} excess cancer risk for carcinogens, a Hazard Index ("HI") of 1 for non-carcinogens, or at the corresponding state MCLs. The cleanup standards are at or below the new Part 201 standards. Lastly, using the Preliminary Remediation Goal ("PRG") tables produced by U.S. EPA Region 9 (see www.epa.gov/region09) as a source of generic risk calculations, the estimated risk presented by exposure to the groundwater contaminant plume under the current cleanup standards remains within U.S. EPA's risk range of 1×10^{-4} to 1×10^{-6} excess cancer risk for carcinogens or an HI of 1 for non-carcinogens. Therefore, the groundwater cleanup standards remain protective of human health and the environment.

Compound	Cleanup Standard	
	<u>Part 201</u>	<u>PRG Table*</u>
Benzene	5.0 ppb	0.35 ppb
Xylene	280 ppb	1400 ppb
Ethylbenzene	74 ppb	1300 ppb
Arsenic	50 ppb	0.04 ppb

Compound	Cleanup Standard	
	<u>Part 201</u>	<u>PRG Table*</u>
Lead	4 ppb	-----
Trichloroethene	5.0 ppb	1.6 ppb
Tetrachloroethene	5.0 ppb	1.1 ppb
cis-1,2-Dichloroethene	70 ppb	61 ppb
trans-1,2-Dichloroethene	100 ppb	120 ppb
Vinyl chloride	2.0 ppb	0.04 ppb
1,1-Dichloroethane	880 ppb	810 ppb

*Note: PRG Table values consider a combined inhalation risk and ingestion risk of 1×10^{-6} or an HI of 1 for use as tap water.

Soil and Sediment

U.S. EPA's PCB cleanup policy and Type B criteria of the Michigan Environmental Response Act 307 of 1982, as amended (Act 307), were used to determine the PCB cleanup standard of 1 mg/kg (ppm) for soils and sediments located outside of the slurry wall or landfilled areas. The federal and state-recommended cleanup standard for PCBs in a residential setting has not been changed. The PRG Table value for PCBs in soils is 0.22 ppm (residential setting). Since a 1.0 ppm cleanup standard remains within U.S. EPA's risk range of 1×10^{-4} to 1×10^{-6} excess cancer risk, the PCB cleanup effort remains protective of human health. Soil and sediment sampling results in the wetlands south on the former oil seep area showed PCB levels at less than 1 ppm and most samples were less than 0.5 ppm. Current cleanup efforts at other Superfund sites in the nation that are river or harbor environments are targeting a PCB cleanup level of 0.25 to 5.0 ppm for the protection of aquatic life, depending on location, exposure assumptions, and other like factors. Since the PCB cleanup level falls within this generic cleanup range, the PCB cleanup at the site remains protective of the environment.

Landfill

Landfill closure ARARs include the Federal Resource Conservation and Recovery Act (RCRA), Subtitle C provisions, and Michigan Act 64, including the landfill cap specifications listed under MSHWR 299.6919. The landfill cap specifications have not changed since the ROD was signed and the ESD was issued.

IV. O&M Review/Site Visit

The Group began submitting monthly treatment plant Discharge Monitoring Reports

("DMR") to the MDEQ in accordance with the SRD in December 1998 and quarterly O&M Reports to U.S. EPA and MDEQ starting with the July to September 2000 period. U.S. EPA and MDEQ also make periodic inspections of the site to observe the constructed remedy.

Generally, a review of the initial quarterly O&M reports shows that the hydraulic containment system was not adequate (as installed) to create the hydraulic conditions (i.e. the 2-foot inward gradient along the slurry wall, water level contours demonstrating capture of the groundwater on the west side of the site) necessary to contain the groundwater/leachate beneath the landfill. Also, the Group has had operational difficulties (e.g. iron fouling) at the treatment plant that required substantial work to be performed to ensure the plant operates as designed. The most recent quarterly report (January through March 2001) provided details of the Group installing higher capacity pumps in the extraction system located along the water main to increase the rate of groundwater extraction to achieve hydraulic containment in that area. The Group also installed larger capacity pumps in certain areas along the slurry wall alignment to increase the pumping rate so that a 2-ft inward gradient could be established in all areas along the slurry wall. The required gradient was established in March 2001, except for one monitoring location which showed a 1.7-foot inward gradient.

Review of the quarterly reports show that contaminant levels are remaining steady in the downgradient groundwater plume, both in the area subject to the extraction system (see Figure 1) and in the area that the modified natural attenuation remedy is being tested. MDEQ has recommended that the groundwater monitoring program be modified to strengthen the data gathering effort in this area to more conform with monitored natural attenuation policies and guidelines.

The RPM inspected the site on April 27, 2001. He found the cap to generally be in good shape as only a few animal burrows and wash-out areas were noted. The Group routinely notes such items during site inspections and arranges for repair of the affected areas as necessary. Landfill gas monitoring results in the quarterly O&M reports show that landfill gas is still being generated at levels that are low but exceed the lower explosive limit at some monitoring points. No landfill gas is being detected off-site.

Review of the monthly DMRs shows that the treatment plant generally met the discharge requirements of the SRD. The Group reported an occasional exceedance of a discharge requirement (e.g. mercury in December 2000) but did not report another exceedance of the same compound in the next months DMR. The Group is required to perform quarterly toxicity testing of the treated effluent and report the results in a DMR. Again, the reports show that the treated water does not exceed toxicity standards in the SRD. The most recent DMR, however, shows that the treated effluent greatly exceeded a chronic toxicity standard (the sample result was 4.8 toxicity units, the standard is 1.75 toxicity units) but not the acute standard. Since the groundwater

treatment plant had never achieved such a high result in the past and the acute toxicity test results were acceptable, MDEQ allowed the Group to continue to operate the plant while the Group reran the test to help determine the cause of the exceedance. The new test results were pending as of the date of this Five-Year Review. (According to the PRP contractor, flooding in Houston, TX, the location of the testing laboratory, apparently delayed receipt of the new samples, causing the holding time to be exceeded. The test was still run to yield qualitative results while another set of new samples were being taken. The retest using the new samples results yielded a chronic toxicity level of 1.2 (1.75 is the standard).)

V. Minor Problems

Past data indicate that leachate is discharging into the wetland area known as "Pond 3," creating periodic low-level chronic toxicity problems in this wetland. The Group has proposed that it install a new pumping well in the area of the discharge to mitigate the situation. This work is in the design phase and the pumping well should be installed by Fall 2001.

The landfill cap drainage layer along the Phase III landfill area (see Figure 1) is leaking water during high rain events. Although this seems to be a normal event in accordance with the design of the landfill cap system, some of the pooled water below the "daylight" pipes is orange-stained (likely due to iron bacteria) and there is a question as to whether the water contains leachate along with the rainwater. The Group has proposed a sampling event to test the water for leachate and later intrusive investigative work may be performed if leachate is actually noted in the water samples.

Groundwater capture along the west side of the water main (where the slurry wall was not installed) may not be entirely successful at this time. Increased rates of pumping may have to occur to ensure complete hydraulic containment as designed.

Several of the mitigated wetlands (Wetlands #2 and #4) are growing very well and the State no longer is scheduling a yearly inspection for them. Others require (Pond 3 - see above) or required (Wetland #1) further work to be performed to ensure that they have a chance to thrive and State inspections may continue. Purple Loosestrife has been noted in some of the wetlands and eradication (uprooting by hand) is scheduled for when the plants are not full of seeds.

Several monitoring wells are no longer functioning as designed. These include MW 4A and MW 4B.

VI. Recommendations

U.S. EPA, in consultation with MDEQ, recommends that the Group continue to perform

the required steps to mitigate the above noted minor problems at the site. Also the Group should continue to operate the groundwater treatment facility as designed until final groundwater cleanup levels, as set forth in the ROD and ESD, are achieved and to also provide hydraulic containment of the landfill. The Group should continue to monitor the landfill cap and landfill gas levels in accordance with state requirements and the O&M Plan.

Several new monitoring wells have been installed at the site area (wells GW1, GW2, GW3, GW10, and GW11). U.S. EPA, in consultation with MDEQ, recommends that they be added to the site groundwater monitoring program and that MW 4A and MW 4B be properly abandoned and replaced within the next six months.

Lastly, U.S. EPA Region 5 has issued new monitored natural attenuation guidance for Superfund sites. The current monitoring program should be compared to the new guidance and modified, as necessary, to strengthen the overall monitoring program at the site.

VII. Statement on Protectiveness

Should the Group continue to operate and maintain the final remedial action components pursuant to the ROD and ESD, as designed, and make the recommended improvements listed above, the remedy selected for the G&H site is protective of human health and the environment.

VIII. Next Five-year Review

The next statutory five-year review at the G&H site is scheduled to be conducted on or about August 31, 2006.



for William E. Muno, Director
Superfund Division

5 Sep 01
Date